APPENDIX F: ACQUISITION MANAGEMENT SYSTEM LIFECYCLE PHASE AND ASSOCIATED SYSTEM ENGINEERING ELEMENT WORK PRODUCTS

F.1 Program Lifecycle

This appendix addresses each phase of the Acquisition Management System (AMS) program lifecycle and the System Engineering (SE) elements, inputs, outputs, and activities for each of the phases. Each AMS phase discussion includes a table that:

- Identifies the SE work products that are inputs to and outputs from the AMS phase
- Identifies the SE element that produces the work products
- Identifies work products generated from processes external to SE that initiate SE activities within the given phase

Table F-1 is a legend of the terms that are used in the subject tables.

Table F-1. Legend for System Engineering Work Products Inputs and Outputs Tables

Abbreviation		Meaning
C	=	Conceptual draft (precedes initial draft). The general notion and structure of the document has been created with minimum content.
CM	=	Configuration Management
EXT	=	External to SE
F	=	Final draft. The document is complete, accurate and awaiting signature.
FA	=	Functional Analysis
I	=	Initial draft. The document has been populated with the majority of required content, but it still requires review for accuracy of information.
IA	=	Integrity of Analysis
IM	=	Interface Management
IARR	=	Investment Analysis Readiness Review
ISRR	=	Initial System Requirements Review
LC	=	Lifecycle Engineering
MSE	=	Maintain Systems Engineering
RM	=	Requirements Management
RSK	=	Risk Management
S	=	Synthesis

Table F-1. Legend for System Engineering Work Products Inputs and Outputs Tables (Continued)

Abbreviation		Meaning
SD	=	Sustaining Document. For work products that are formal documents, the documents are sustained in the given phase. For work products that are not formal documents, the products are introduced, further developed, or sustained in the given phase.
SpecEng	=	Specialty Engineering
ITP	=	Integrated Technical Planning
TS	=	Trade Studies
Val	=	Validation

F.2 Work Products Associated With the AMS JRC Reviews

In Chapter 3, Table 3.3-2, "AMS/SE Work Products Inputs/Outputs for AMS Phases," presents a high-level view of the various SE work products and the AMS phase in which they are developed. The table shows the JRC decisions that mark the culmination of each of the AMS phases. The following sections discuss the inputs and outputs to the AMS phase work products, the developmental status of the work products, and the producing SE element(s). This is developed for each of the AMS phases (i.e., Mission Analysis, Initial and Final Investment Analyses, Solution Implementation, and Service Management).

F.3 Inputs and Outputs for the Mission Analysis Phase

As discussed in Chapter 3, the primary inputs to the Mission Analysis Mission Analysis (MA) phase are the concept of a given "need" and approval to initiate SE efforts. The primary outputs of the MA phase are the final Mission Need Statement, an initial Requirements Document, initial Solution Alternatives, Concept of Use, an initial Lifecycle Cost Estimate, successful completion of the Investment Analysis Readiness Review and an Initial Investment Analysis Plan. Table F-2 summarizes the MA SE inputs and outputs and the developmental status of each work product at the beginning and end of the MA phase. Column 2 contains the producing SE element.

Table F-2. Mission Analysis System Engineering Inputs and Outputs

WORK PRODUCT	PRODUCING SE ELEMENT	INPUT	OUTPUT
Analysis Criteria	IA		I
Concept of Operations	FA	I	F
Concerns/Issues	ALL		SD
Constraints	ALL except TS		SD
Corporate Strategy and Goals	EXT	SD	
Credible Analysis Results	IA		SD

Table F-2. Mission Analysis System Engineering Inputs and Outputs (Continued)

WORK PRODUCT	PRODUCING SE ELEMENT	INPUT	OUTPUT
Description of Alternatives	S, TS		I
Design Analysis Reports	SpecEng		SD
Design Constraint	S		SD
FAA Management Decisions	EXT	SD	
FAA Policy	EXT	SD	
Functional Architecture	FA		I
Government and International Regulations and Statutes	EXT	SD	
Integrated Lifecycle Plan	ITP		C
Integrated Program Schedule	EXT		C
Investment Analysis Readiness Review	FA, RM, TS	I	F
Legacy System	EXT	SD	
Lifecycle Cost Estimate	LC		I
Market Research	EXT	SD	
Mission Need Statement	RM	I	F
NAS Architecture	ITP	SD	
NAS Concept of Operations	FA	SD	
NAS System Engineering Management Plan	MSE	SD	
Need	EXT	SD	
Operational Services and Environmental Description	FA		C
Planning Criteria	ALL except ITP		SD
Requirements	RM		I
Risk Management Plan	RSK		I
Stakeholder Needs	EXT	SD	
Technology	EXT	SD	
Validated Need	Val	I	F
Validation Reports	Val		SD
Verification Requirements Traceability Matrix	RM		C
Work Breakdown Structure	EXT	C	
NOTE: See Table F-1 for legend.			

F.4 Inputs and Outputs for Initial Investment Analysis Stage of the IA Phase

As stated earlier, the Investment Analysis (IA) phase of the AMS contains two stages: (1) the initial IA stage and (2) the final IA stage. The most important output of the initial IA stage is selection of a problem solution from the set of viable alternatives. In addition to the final Requirements Document, a considerable number of important program documents are produced in final form. Table F-3 portrays the Initial IA stage inputs and outputs as well as the SE elements that produce them.

Table F-3. Initial Investment Analysis System Engineering Inputs and Outputs

WORK PRODUCT	PRODUCING SE ELEMENT	INPUT	OUTPUT
Acquisition Program Baseline	ITP		I
Analysis Criteria	IA	I	F
Concept of Operations	FA	F	SD
Concerns/Issues	ALL	SD	SD
Configuration Description	S	C	I
Constraints	ALL except TS	SD	SD
Corporate Strategy and Goals	EXT	SD	
Credible Analysis Results	IA	SD	SD
Demonstrations	SpecEng		SD
Description of Alternatives	S	I	F
Design Analysis Reports	SpecEng	SD	SD
Design Constraint	S	SD	SD
External Environmental Forces	EXT	SD	
FAA Management Decisions	EXT	SD	
FAA Policy	EXT	SD	
Functional Architecture	FA	I	F
Functional Specification	FA	C	I
Government and International Regulations and Statutes	EXT	SD	
Integrated Lifecycle Plan	ITP	C	I
Integrated Program Plan	ITP	C	I
Integrated Program Schedule	EXT	C	I
Interface Requirements Documents	IM	C	I
Investment Analysis Readiness Review	FA, RM, TS	F	SD
Legacy System	EXT	SD	
Lifecycle Cost Estimate	LC	I	SD
Market Research	EXT	SD	
Master Verification Plan	ITP		I
Mission Need Statement	RM	F	SD
NAS Architecture	ITP	SD	
NAS Concept of Operations	FA	F	SD
NAS System Engineering Management Plan	MSE	SD	
Operational Concept Demonstrations	S	SD	
Operational Services and Environmental Description	FA	C	I
Physical Architecture	S	C	I
Planning Criteria	ALL Except ITP	SD	SD
Program Risk Summary	RSK	I	F

Table F-3. Initial Investment Analysis System Engineering Inputs and Outputs (Continued)

WORK PRODUCT	PRODUCING SE ELEMENT	INPUT	OUTPUT
Requirements	RM	I	F
Risk Management Plans	RSK	I	F
Stakeholder Needs	EXT	I	F
System Engineering Management Plan	ITP	C	I
Technology	EXT	SD	SD
Tools/Analysis Requirements	ALL Except EXT, ITP, IM, IA, CM, Val		SD
Trade Study Reports	TS	SD	SD
Validation Reports	Val	SD	SD
Verification Criteria	SpecEng		SD
Verification Requirements Traceability Matrix	RM	C	I
Work Breakdown Structure	EXT	C	I
NOTE: See Table F-1 for legend.			

F.5 Inputs and Outputs for the Final Investment Analysis Stage of the IA Phase

Since the alternative selection was made during the initial IA stage, the final IA stage refines the physical architecture and adds maturity to the documentation. The Acquisition Program Baseline and the program functional specification are completed and finalized. Table F-4 contains the final IA stage inputs and outputs as well as the SE element that produces them.

Table F-4. Final Investment Analysis System Engineering Inputs and Outputs

WORK PRODUCT	PRODUCING SE ELEMENT	INPUT	OUTPUT
Acquisition Program Baseline	ITP	I	F
Certification Package	SpecEng	C	I
Concerns/Issues	ALL	SD	SD
Configuration Description	S	I	F
Constraints	ALL Except TS	SD	SD
Corporate Strategy and Goals	EXT	SD	SD
Credible Analysis Results	IA	SD	SD
Demonstrations	SpecEng	SD	SD
Design Analysis Reports	SpecEng	SD	SD
Design Constraint	S	SD	SD
External Environmental Forces	EXT	SD	SD

Table F-4. Final Investment Analysis System Engineering Inputs and Outputs (Continued)

WORK PRODUCT	PRODUCING SE ELEMENT	INPUT	OUTPUT
FAA Management Decisions	EXT	SD	SD
FAA Policy	EXT	SD	SD
Functional Architecture	FA	F	SD
Functional Specification	FA	I	F
Government and International Regulations and Statutes	EXT	SD	SD
Integrated Lifecycle Plan	ITP	I	F
Integrated Program Plan	ITP	I	F
Integrated Program Schedule	EXT	I	F
Interface Control Documents	IM		
Interface Requirements Documents	IM	I	F
Legacy System	EXT	SD	
Lifecycle Cost Estimate	LC	I	F
Market Research	EXT	SD	
Master Verification Plan	ITP	I	F
NAS Architecture	ITP	SD	SD
NAS Concept of Operations	FA	SD	SD
NAS System Engineering Management Plan	MSE	SD	SD
Operational Concept Demonstrations	S	SD	SD
Operational Services and Environmental Description	FA	I	F
Physical Architecture	S	I	F
Planning Criteria	ALL Except ITP	SD	SD
Program Risk Register	RSK	SD	SD
Program Risk Summary	RSK	SD	SD
Requirements	RM	F	SD
Requirements Verification Compliance Document	RM	I	F
Risk Management Plans	RSK	F	SD
Stakeholder Needs	EXT	SD	
Standards	EXT	SD	
Statement of Work	EXT	I	F
System Engineering Management Plan	ITP	I	F
System Requirements Document	ITP, RM, FA		I
Technology	EXT	SD	SD
Test and Assessment Articles	ALL Except EXT, ITP, IM, CM, & Val	C	I

Table F-4. Final Investment Analysis System Engineering Inputs and Outputs (Continued)

WORK PRODUCT	PRODUCING SE ELEMENT	INPUT	OUTPUT
Tools/Analysis Requirements	ALL Except EXT, ITP, IM, CM, & Val	SD	SD
Trade Study Reports	TS	SD	SD
Validation Reports	Val	SD	SD
Verification Criteria	SpecEng	SD	SD
Verification Requirements Traceability Matrix	RM	I	F
Work Breakdown Structure	EXT	I	F
Note: See Table F-1 for legend.			

F.6 Inputs and Outputs for the Solution Implementation Phase

All products are completed and finalized at various points before completion of the Solution Implementation (SI) phase. During the SI phase, each program may decide when each product is required. For example, it is recommended that final Interface Control Documents be in place before implementation and well established for Preliminary Design Review and Critical Design Review. Table F-5 summarizes the SI inputs and outputs as well as the SE element that produces them.

Table F-5. Solution Implementation System Engineering Inputs and Outputs

WORK PRODUCT	PRODUCING SE ELEMENT	INPUT	OUTPUT
Acquisition Program Baseline	ITP	F	SD
Approved Baseline Changes	CM	SD	SD
Baselines	CM	SD	SD
Certification Package	SpecEng	I	F
Concerns/Issues	ALL	SD	SD
Configuration Description	S	I	F
Configuration Status Report	CM	SD	SD
Constraints	ALL except TS	SD	SD
Corporate Strategy and Goals	EXT	SD	SD
Credible Analysis Results	IA	SD	SD
Demonstrations	SpecEng	SD	SD
Design Analysis Reports	SpecEng	SD	SD
Design Constraint	S	SD	SD
Disposal Plan	LCE		F
External Environmental Forces	EXT	SD	SD
FAA Management Decisions	EXT	SD	SD
FAA Policy	EXT	SD	SD

Table F-5. Solution Implementation System Engineering Inputs and Outputs (Continued)

WORK PRODUCT	PRODUCING SE ELEMENT	INPUT	OUTPUT
Functional Architecture	FA	SD	SD
Government and International Regulations and Statutes	EXT	SD	SD
Integrated Lifecycle Plan	ITP	SD	SD
Integrated Program Plan	ITP	SD	SD
Integrated Program Schedule	EXT	SD	SD
Interface Change Request	IM	SD	SD
Interface Control Documents	IM	I	F
Interface Requirements Documents	IM	SD	SD
Interface Revision Proposal	IM	SD	SD
Legacy System	EXT	SD	SD
Master Verification Plan	ITP	SD	SD
NAS Architecture	ITP	SD	SD
NAS Concept of Operations	FA	SD	SD
NAS System Engineering Management Plan	MSE	SD	SD
Physical Architecture	S	I	F
Planning Criteria	ALL Except ITP	SD	SD
Program Risk Register	RSK	SD	SD
Program Risk Summary	RSK	SD	SD
Requirements	RM	SD	SD
Requirements Verification Compliance Document	RM, Verification	F	SD
Risk Management Plans	RSK	SD	SD
Stakeholder Needs	EXT	SD	SD
Standards	EXT	SD	SD
Statement of Work	EXT	F	SD
System Requirements Document	ITP, RM, FA	I	F
Test and Assessment Articles	ALL except IM, CM, & Val	I	F
Tools/Analysis Requirements	ALL except IM, CM, & Val	SD	SD
Trade Study Reports	TS	SD	SD
Updated Baselines	CM	SD	SD
Validation Reports	Val	SD	SD
Verification Criteria	SpecEng	SD	SD
Verification Requirements Traceability Matrix	RM, Verification	SD	SD
NOTE: See Table F-1 for legend.			